

What is claimed is:

- 1 1. A sheet abrasive comprising:
  - 2 a thermoplastic polymer layer; and
  - 3 a plurality of abrasive particles dispersed therein.
- 1 2. The sheet abrasive of claim 1, wherein the thermoplastic polymer layer is selected from  
2 the group consisting of polyamides, polyurethanes, acetals, thermoplastic polyimides, liquid  
3 crystal polymers, polyphenylene sulfides, polyetheramides, polyetheresters, and polyethylene.
- 1 3. The sheet abrasive of claim 1, wherein the plurality of abrasive particles is selected from  
2 the group consisting of silicon carbide, aluminum oxide, diamond, ceramic aluminum oxide,  
3 ceramic, zirconia aluminum, garnet, cubic boron nitride, and talc.
- 1 4. The sheet abrasive of claim 1, wherein the polymer layer has a thickness from about  
2 0.001 inch to about 0.25 inch.
- 1 5. The sheet abrasive of claim 1, wherein the plurality of abrasive particles is dispersed  
2 substantially uniformly within the thermoplastic polymer layer.
- 1 6. The sheet abrasive of claim 1, wherein the thermoplastic polymer layer is an extruded  
2 thermoplastic polymer layer.
- 1 7. The sheet abrasive of claim 6, wherein the extruded thermoplastic polymer layer is  
2 uni-axially oriented.
- 1 8. The sheet abrasive of claim 6, wherein the extruded thermoplastic polymer layer is  
2 bi-axially oriented.
- 1 9. The sheet abrasive of claim 1, wherein the thermoplastic polymer layer is an  
2 injection-molded thermoplastic polymer layer.
- 1 10. The sheet abrasive of claim 1, wherein the thermoplastic polymer layer comprises a  
2 foamed thermoplastic polymer.
- 1 11. The sheet abrasive of claim 1, wherein the abrasive particles comprise from about 1% to  
2 about 30% by volume of the sheet abrasive.

1    12.    The sheet abrasive of claim 1, wherein the abrasive sheet is adapted to form a continuous  
2    belt.

1    13.    The sheet abrasive of claim 1, wherein the abrasive sheet is adapted to form a flap wheel.

1    14.    The sheet abrasive of claim 1, further comprising a second layer adjacent to the  
2    thermoplastic polymer layer.

1    15.    The sheet abrasive of claim 14, wherein the second layer comprises a polymer.

1    16.    The sheet abrasive of claim 14, wherein the second layer further comprises a plurality of  
2    abrasive particles.

1    17.    The sheet abrasive of claim 14, further comprising an adhesive layer disposed between  
2    the thermoplastic polymer layer and the second layer.

1    18.    The sheet abrasive of claim 14, wherein the abrasive sheet is adapted to form a  
2    continuous belt.

1    19.    The sheet abrasive of claim 14, wherein the abrasive sheet is adapted to form a flap  
2    wheel.

1    20.    A method of forming a sheet abrasive comprising the steps of:

2                 dispersing a plurality of abrasive particles in a molten thermoplastic polymer; and  
3                 extruding the molten thermoplastic polymer to form a sheet abrasive,

4                 wherein the sheet abrasive comprises an extruded thermoplastic polymer layer and the  
5    plurality of abrasive particles dispersed therein.

1    21.    The method of claim 20, wherein the thermoplastic polymer is extruded to form an  
2    extruded thermoplastic layer having a thickness from about 0.001 inch to about 0.25 inch.

1    22.    The method of claim 20, comprising orienting the extruded thermoplastic polymer layer  
2    in a uni-axial or bi-axial direction.

1    23.    The method of claim 22, wherein the orienting step comprises stretching the extruded  
2    thermoplastic polymer layer.

1    24.    The method of claim 20, further comprising the step of providing a second layer adjacent  
2    to the extruded thermoplastic polymer layer.

- 1    25.    The method of claim 24, wherein the second layer further comprises a plurality of
- 2    abrasive particles.
- 1    26.    The method of claim 24, wherein the second layer comprises a polymer.
- 1    27.    The method of claim 26, wherein providing the second layer comprises co-extruding the
- 2    extruded thermoplastic polymer layer and the second layer.
- 1    28.    The method of claim 24, wherein providing the second layer comprises adhering the
- 2    second layer to the extruded thermoplastic polymer layer with an adhesive.
- 1    29.    A method of forming a sheet abrasive comprising the steps of:
  - 2                dispersing a plurality of abrasive particles in a thermoplastic polymer; and
  - 3                injecting the thermoplastic polymer into a mold to form a sheet abrasive,
  - 4                wherein the sheet abrasive comprises an injection-molded thermoplastic polymer layer
  - 5                and the plurality of abrasive particles dispersed therein.